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- (11) Japanese Laid-Open Patent Application No. 3-2882
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- (71) Applicant: Minolta Camera Co., Ltd.
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(54) [Title of the Invention] DEVELOPER FEEDER

SPECIFICATION

1. Title of the Invention

DEVELOPER FEEDER

2. Claim

[Claim 1] A developer feeder comprising a cylindrical container having an opening at one end and a spiral groove formed along the internal peripheral surface of the cylindrical container extending in an axial direction, wherein developer accommodated in the cylindrical container is conveyed along the spiral groove to be fed through the opening by arranging the cylindrical container substantially horizontally and rotating the cylindrical container in the circumferential direction, the developer feeder comprising supporting points disposed outside both ends of the cylindrical container, wherein the cylindrical container is

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supported rotatably about the supporting points, and a rotational force is transmitted to the cylindrical container via at least one of the supporting points.

3. Detailed Description of the Invention

[Technical Field of the Invention] The present invention relates to a developer feeder for supplying developer to a developing device of an image forming apparatus such as a copying machine, printer, and facsimile machine, using powder developer.

[Description of the Related Arts] Hitherto, an image forming apparatus has been known, in which a container accommodating developer therein is detachably disposed in an image-forming apparatus body, and the developer taken and fed from the container is once stored in a storage and replenished to a developing device by conveying means.

However, this image-forming apparatus requires for a space of the container to be equipped therein in addition to the space for the storage, so that the image-forming apparatus is increased in size. When developer is once supplied from the container to the storage, the space for accommodating the container becomes substantially unnecessary, resulting in the reduced space efficiency.

Then, it is disclosed in Japanese Patent Laid-open No. 53-146639 that a developer container comprises a cylinder having an opening at one end and a spiral groove formed on

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the internal periphery, and developer is conveyed along the spiral groove within the rotating cylinder to the end of the container so as to be directly supplied to a developing device. This container does not require a storage, improving the space efficiency correspondingly.

[Problems to be Solved by the Invention] However, the above-mentioned developer feeder is provided with gear teeth formed on the external periphery of the container in the circumferential direction while a driving gear is arranged on a side of a container-accommodating part, so that the driving gear is meshed with the gear teeth. That is, a conveying force is applied to the container in a tangential direction, and the container is rotated by the conveying force. Moreover, the conveying force is uniformly applied in the circumferential direction.

Accordingly, the rotational axis of the container accommodated in the accommodating part sways, so that the cylindrical container vibrates in the accommodating part. Therefore, a contact position between the cylindrical container and the accommodating part, and also the frictional force change, so that a load applied to the driving gear largely fluctuates. Also, the position of the opening for supplying developer in the cylindrical container is misaligned with the position of a developer inlet of the accommodating part leading to the opening, so that developer

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spills out of the clearance between these openings so as to contaminate the surrounding area therewith, or the spilled developer enters between the container and the accommodating part, so that the frictional force between the container and the accommodating part increases, resulting in further increase in the driving load.

[Means for Solving the Problems] The present invention has been made in order to solve the above mentioned problems, a developer feeder comprises a cylindrical container having an opening at one end and a spiral groove formed along the internal peripheral surface of the cylindrical container extending in an axial direction, wherein developer accommodated in the cylindrical container is conveyed along the spiral groove to be fed through the opening by arranging the cylindrical container substantially horizontally and rotating the cylindrical container in the circumferential direction, and the developer feeder comprises supporting points disposed outside both ends of the cylindrical container, wherein the cylindrical container is supported rotatably about the supporting points, and a rotational force is transmitted to the cylindrical container via at least one of the supporting points.

[Operation] In the developer feeder described above, the both ends of the cylindrical container are supported via the supporting points while a rotational force is transmitted

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via the supporting points, so that the rotational shaft is stable and the load to the driving system is reduced.

[Embodiments] An embodiment according to the present invention will be described below with reference to the attached drawings.

In Figs. 1 and 2, numeral 1 denotes a container for supplying developer (referred to as a container below), and the container 1 comprises a cylinder 2 with one opened end and the other closed end and a lid 10 detachably arranged at the opened end of the cylinder 2. In addition, the other end of the cylinder 2 may also be closed with a lid.

The cylinder 2 made of a thermoplastic resin integrally formed by blow molding comprises ribs 3 protruding inside and spirally formed along the internal spherical surface and a spiral groove 4 formed between the ribs 3. The cylinder 2 is provided with an opening 6 formed at the opened end (the left in Fig. 1) in the vicinity of the end 5 of the spiral groove 4 and a recess 8 formed in the center on a rear wall 7 at the closed end of the cylinder 2 and protruding inwardly.

The lid 10 is provided with a conical restriction section 11 bulging toward the closed end (the right in Fig. 1) and having an apex located on the central axis and an engaging recess 12 formed at the center on the external surface of the lid 10. In addition, the restriction section

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11 may be hemispherical-shaped or half oval-spherical-shaped.

The container 1 configured as described above with the opening 6 covered with sealing tape (not shown) is filled with toner X and hermetically sealed with the lid 10. In addition, the container 1 may be filled with a starter made of toner and a magnetic carrier, instead of the toner X.

A toner-conveying device 20 having the container 1 attached thereto, as shown Figs. 3 and 4, comprises a substantially U-shaped frame 21, a replenishing hole 22 formed on the bottom of the frame 21, and a conveying tube 24 having the replenishing hole 22 located on the upper side of one end of the conveying tube 24 and being connected to a developing device. In addition, the frame 21 is provided with sealing members 23 and 23' such as sponge respectively arranged on the both sides of the replenishing hole 22 along the U-shaped internal surfaces thereof. Also, the conveying tube 24 is provided with a conveying screw 25 accommodated therein, which is to be rotated by a motor (not shown). Furthermore, a driving device 26 is arranged on the side of the frame 21 and a driving shaft 27 of the driving device 26 protrudes inside the frame 21. On the other hand, a shaft 28 is disposed on the opposite side of the driving device 26 coaxially with the driving shaft 27, and the shaft 28 is movable in the axial direction.

For the toner-conveying device 20, the container 1 is

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constructed such that the opened end thereof is supported by the frame 21, the engaging recess 12 of the lid 10 is brought into engagement with the end of the driving shaft 27, and the recess 8 on the closed side is brought into engagement with the tip end of the shaft 28 by pressing, so that the container 1 is rotatably supported substantially horizontally using the shafts 27 and 28 as supporting points. In addition, when the container 1 is attached to the toner-conveying device 20, the opening 6 of the cylinder 1 is located in the upper part, and the opening 6 is opened by peeling off the sealing tape before or after the attaching.

The container 1 attached to the toner-conveying device 20 in such a manner is rotated in the arrow a direction about the driving shaft 27 and the shaft 28 opposing to the driving shaft 27 when the driving shaft 27 of the driving device 26 rotates in the arrow a direction.

The toner X accommodated in the container 1 moves toward the opened end along the spiral groove 4 as a whole by the rotation of the container 1 in the arrow a direction. When the toner X is conveyed to a space 13 between the restriction section 11 of the lid 10 and the internal surface of the container 1 (referred to as a restriction space below), since with approaching closer to the opened end, the space is reduced in the cross-sectional area, the movement of the toner X toward the opened end is restricted.

so that the amount of the toner arriving the opened end becomes constant.

When reaching the opened end along the spiral groove 4, the toner X is dropped and supplied to the conveying tube 24 from the opening 6 via the replenishing hole 22 when the opening 6 is located in the lower part with the rotation of the container 1. That is, every on rotation of the container 1, a constant amount of the toner is supplied to the conveying tube 24. Then, the toner X supplied to the conveying tube 24 is conveyed to the developing device based on the rotation of the conveying screw 25.

When amounts of the toner supplied to the conveying tube 24 are represented as ordinate, and the number of rotation of the container 1 is represented as abscissa, as shown by the solid line of Fig. 5, the amount of the toner at one rotation is stable except of states of the directly after the attaching of the container 1 and of the toner empty.

In addition, the curve indicated by the dotted line in Fig. 5 shows the result when the opening 6 is kept away from the vicinity of the end 5 of the spiral groove 4. From the curve, it is understood that when the opening 6 is kept away from the end 5 of the spiral groove 4, the toner X conveyed along the spiral groove 4 is released from the restriction of the ribs 3 to be dispersed or to flow backward when

running over the end 5 of the spiral groove 4, so that the amount of the toner at one rotation becomes unstable.

Fig. 6 shows that both the engaging recess 12 of the lid 10 and the recess 8 disposed on the rear wall 7 of the cylinder 2 are increased in depth, and the driving shaft 27 and the shaft 28 are inserted therein respectively. In this case, the cylinder 2 is securely supported, further stabilizing the rotation of the cylinder 2.

Fig. 7 shows that the frame 21 is provided with a wall 21a opposing the lid 10, and on the opposing surfaces of the wall 21a and the lid 10, identically-shaped ring members 30 and 31 made of polyurethane foam are arranged about the driving shaft 27, respectively. In this case, the opposing surfaces of the both ring members 30 and 31 slide corresponding to the rotation of the cylinder 2. By the existence of the ring members 30 and 31, the spilled toner from the cylinder 2 cannot adhere to the driving shaft 27 or enter the engaging recess 12, preventing the driving system from being contaminated. In addition, when the ring members 30 and 31 are provided with a low-frictional member such as polytetrafluoroethylene, the load applied to the driving system of the cylinder 2 may not be so increased.

Fig. 8 shows a supporting structure of the shaft 28 for supporting one end of the cylinder 2. In the drawing, the shaft 28 is disposed in an arm 33 rotatably attached to a

supporting shaft 32, and the arm 33 is urged in the arrow direction by a spring 34. Therefore, the shaft 28 is pressed and brought into engagement with the recess 8 of the cylinder 2. When the cylinder 2 is removed, the arm 33 may be shunted in the direction opposite to the arrow.

Figs. 9 to 11 show a toner-conveying device according to another embodiment.

In the toner-conveying device, the bottom portion of an accommodating container 10 is formed by corresponding to the external peripheral shape of the cylinder 2, and to an opening 41, a feed pipe 42 is connected. Also, a toner conveying pipe 45 having a screw 46 is provided with a connecting pipe 43 formed therein. To the connecting pipe 45, the feed pipe 42 is connected, the contact portion between the feed pipe 42 and the connecting pipe 43 is sealed with a ring-shaped sealing member 44.

Therefore, in the toner-conveying device, the accommodating container 40 is rotatable in directions of arrows b and b' via the feed pipe 42 and the connecting portion to the connecting pipe 43. Thereby, the accommodating container 40 is moved outside the body of the image forming apparatus so that the container 1 is detachable at a position not interfering with other members. At this time, the toner spilled from the container 1 in the accommodating container 40 cannot fall down in the periphery.

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Furthermore, in the accommodating container 40, since the peripheral sidewalls are large enough in height, even the toner spilled from the container 1 in the accommodating container 40 is transported in the circumferential direction by the rotation of the container 1, it cannot jump out across the sidewalls.

According to the embodiment, in the container 1, the developer falling hole (the opening 6) is formed on the external periphery of the cylinder 2; however, it may be formed on the lid 10.

Also, the lid 10 is provided with the engaging recess 12 and the cylinder 2 is provided with the recess 8 so as to be brought engagement with the driving shaft 27 and the shaft 28, respectively; alternatively, in the lid 10 and the cylinder 2 or in lids arranged on both ends of a cylinder, if the cylinder has opened both ends, supporting shafts may be respectively arranged, to which a rotational force may be transmitted.

[Advantages] As is apparent from the description above, in the developer feeder according to the present invention, the cylinder is rotated in the circumferential direction via the supporting parts disposed at both ends.

Therefore, the rotational axis of the cylinder is stable and the central axis cannot vibrate, so that the driving load is stable. Since the supplying hole (opening)

of developer is stable in position, the displacement between the falling hole and a developer-receiving hole leading to the falling hole cannot occur so that developer cannot spill in the periphery so as to contaminate it.

4. Brief Description of Drawings

Fig. 1 is a longitudinal sectional view of a developer supplying container; Fig. 2 is a perspective view of the developer supplying container; Fig. 3 is a cross-sectional view of the developer supplying container and a replenishing section; Fig. 4 is a longitudinal sectional view of the developer supplying container and the replenishing section; Fig. 5 is a drawing showing the relationship between the number of rotation of the developer supplying container according to the present invention and the replenishing amount of developer at one rotation; Figs. 6 to 8 show another embodiment of a developer supplying container, in which Fig. 6 is a longitudinal sectional view of the developer supplying container and Figs. 7 and 8 are partial sectional views; Figs. 9 to 11 show another embodiment of an accommodating container, in which Fig. 9 is a perspective view, Fig. 10 is a cross-sectional view, and Fig. 11 is a longitudinal sectional view.

- 1: developer supplying container (container)
- 2: cylinder
- 3: rib

4: spiral groove
6: opening
8: recess
10: lid
12: engaging recess
26: driving device
27: driving shaft
28: shaft

Applicant: Minolta Camera Co., Ltd.
Agent: Patent Attorney, Tamotsu AOYAMA, et al.

Drawings:

Fig. 1

1: DEVELOPER SUPPLYING CONTAINER
2: CYLINDER
4: SPIRAL GROOVE
10: LID
11: RESTRICTION SECTION

Fig. 2

6: OPENING

Fig. 3

DEVELOPING DEVICE

Fig. 4

Fig. 5

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REPLENISHING AMOUNT OF DEVELOPER AT ONE ROTATION
NUMBER OF ROTATION OF DEVELOPER SUPPLYING CONTAINER (NUMBER)

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

Fig. 11

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発明の名称 画像判読装置

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要 旨

1. 発明の名称

画像判読装置

2. 特許請求の範囲

(1)一紙に複数の文字が印刷されておる方向に
置かれた紙面を撮り、その紙面に印刷された文字に
対し、この紙面を四角に囲って内部に収め
られている画像データを記憶装置に記憶し、
前記画像データを介して読み取り装置が画像に上
いて、前記画像データをその画像の領域に受け止
点を中心にして任意に拡大するとともに、少な
くとも一方の文字を介して図形力を使
えるようにしたことを特徴とする画像判読装置。

3. 発明の利便性

(装置上の利便性)

本装置は、図形認識装置に用いる画像、プ
ラ、フィクレータの画像形成装置の画像形成
に画像判読装置が画像判読装置に用いるもの
である。

(装置の構造)

従来の、画像判読装置として、画像判読装置に
おける画像形成装置本体に画像判読装置、この
装置から画像形成装置本体の画像形成装置に一旦所
属し、ここから画像判読装置に画像判読装置に用いるもの
が知られている。

しかしながら、この画像判読装置では、画像判
読装置に画像判読装置を記憶するためのメモリーを必要
とするので、画像判読装置が大型化する。また、
画像判読装置に画像判読装置が記憶されてしまえば、
画像判読装置のスペースは実質的に不足するおそれ、
スペース効率が悪くなるおそれがある。

そこで、画像判読装置として、一紙に複数の
文字が印刷されておる方向に置かれた紙面を撮り、
この紙面を四角に囲って内部に収められている画像
データを記憶装置に記憶し、前記画像データを介して
読み取り装置が画像に上いて、前記画像データをその
画像の領域に受け止点を中心にして任意に拡大する
とともに、少なくとも一方の文字を介して図形力を使
えるようにしたことを特徴とする画像判読装置。

(発明が解決しようとする課題)

特開平3-2882(2)

しかしながら、前記型用供給装置では、容室の外周部に力方向に沿ってダイヤを設けるとともに、容室収容部の周壁に吸着ダイヤを配置し、吸着ダイヤを前記ダイヤ部に適合させるようにしている。すなわち、容室は、外周面に法線方向の吸着力を加え、圧縮力に等しい圧力を受けるようになつており、しかもその吸着力は周壁に均等に作用する構成となつていない。

したがって、収容部に収容されている容室の留着力が低く、円筒容器が収容部の中で動くことになる。このため、円筒容器と収容部との接触位置及び接触力が変化し、吸着ダイヤにかかる負荷が大きくなり変動する。また、円筒容器における実効供給用の開口部とこれと近接する収容部の吸着部流入口との位置がずれ、これらの隙間から吸着剤がこぼれて漏れや汚染したり、こぼれた吸着剤が容室と収容部との間に入り、容室と収容部との吸着力が大きくなって駆動負荷が増大する。

〈問題を解決するための手段〉

本発明は、前記問題を解決するためになされ

たもので、一端に円筒容器の内周面に沿って軸方向に延びる接合部を設けた円筒容器を軸水平に配置し、この円筒容器を軸方向に回転して内部に収容されている容室を前記供給部に沿って搬送し、前記開口部を介して送り出す吸着剤供給装置において、前記円筒容器をその両端外周部に設けた支点部を中心として回転可能に支持するとともに、少なくともいずれか一方の支点部を介して回転力を伝えるようにしたものである。

〔作用〕

前記型用供給装置では、円筒容器は円筒の支点部を介して支持されるとともに、該支点部を介して回転力が伝えられるので、回転力が安定し、駆動部にかかる負荷が少なくなる。

〔実施例〕

以下、添付図面を参照して本発明の一実施例について説明する。

第1、2図において、1は型用供給装置(以下、「装置」という。)で、一端を開放し他端を閉鎖した円筒体2と、この円筒体2の両端部に設置自在

に設けられ10と称される。なお、円筒体2の他端部も蓋で閉鎖するようにしてもよい。

円筒体2は、円筒状体を用いてブロー成形により一体的に形成したもので、内部に突出する突起3が内周面に沿って螺旋状に形成され、突起3と突起3との間に螺旋溝4が形成されている。また、円筒体2の両端部(第1図に示される左図)には、螺旋溝4の終端部5の近傍に開口部6が設けられており、円筒体2の両端部の螺旋溝7には中央に内側へ突出した部材8が設けられている。

蓋10は、内面を円筒体2の両端部(第1図に示される右図)に向かつて突出し、円筒体2の中心軸上に頂点を有する円錐状の頂部部11が設けられており、蓋10の外周には円錐状の頂部部12が設けられている。なお、頂部部11は、半球状又は半球形円錐状としてもよい。

前記構成からなる装置1は、円筒体2の開口部6を閉鎖しないケーシング等で覆い、トナーXが充填され、蓋10で密封される。なお、トナーXに代えて、トナーと磁性キャリアとからなるマ

グネットを充填してもよい。

装置1を搬送するトナー搬送装置20では、第3、4図に示すように、フレーム21が略U字状に形成され、その底面に設けられた開口22が、吸着部23に接続されている輸送部24の一端上部に位置してある。なお、フレーム21には、そのU字の内面に沿って開口22の両側にそれぞれスベリ止めのケーシング部材25、26が設けられている。また、輸送部24には搬送部材25が収容してあり、回転しないローラで回転するようにしてある。さらに、フレーム21の両端には駆動部材27が設けられており、その駆動軸27がフレーム21の内側に突出させてある。一方、駆動部材28の反対側には、駆動軸27と同軸上に軸28が設けられており、この軸28は駆動方向に延びるようにしてある。

前記トナー搬送装置20に対して、装置1はその開口部をフレーム21に密封させ、蓋10の係合凹部12に駆動軸27の先端を係合し、両端部の開口部6に軸28の先端を圧入して係合し、これ

このため、収容容器40を固定板収容部の本体外に移動させ、筒の内部と干渉しない位置で容置1を収容することができる。また、その際、容置1から収容容器40にこぼれたトナーが筒内に落下することもない。さらに、収容容器40では、筒内の面積が十分大きくしてあるので、容置1から収容容器40にこぼれたトナーが容置1の筒内にこぼれて筒内面に付着されても、筒壁を越えて外部に漏れ出すことはない。

なお、以上の説明では、容置1において現像剤受下口（開口部6）を円筒体2の外周部に設けたが、筒10に設けてもよい。

また、筒10に係合部12を設け、円筒体2に図8を設け、これらにそれぞれ図8は27、筒28を係合して支持せしめるものとしたが、筒10及び円筒体2、又は円筒体2が筒壁を開放したものであれば筒壁に設けられたそれぞれ支持部を設け、これらの支持部に回転力を伝達するようにしてもよい。

(説明の効果)

図面を参照する。

1—現像剤供給容器（容置）、2—円筒体、3—矢矢、4—螺旋溝、6—開口部、8—凹部、10—筒、12—係合部、28—螺旋溝、27—螺旋溝、28—凹部。

特許出願人 エルメック株式会社
代理人 弁護士 青山 幸 ほか1名

以上の説明で明らかなように、本発明にかかる現像剤供給容器では、円筒体は筒壁の支持部を介して筒内面に固定される。

したがって、円筒体の回転中心が一定し、その中心軸が変動することはないので、回転位置が安定する。また、現像剤の供給口（開口部）の位置が安定するので、筒壁下口とこれに導き入る現像剤受入口との位置ずれがなく、現像剤が筒内にこぼれて汚染することもない。

4. 図面の簡単な説明

第1図は現像剤供給容器の縦断面図、第2図は現像剤供給容器の筒壁の断面図、第3図は現像剤供給容器及び筒壁の断面図、第4図は現像剤供給容器及び筒壁の断面図、第5図は本発明にかかる現像剤供給容器の筒壁の断面図と一図相当の現像剤供給容器の筒壁の断面図を示す図、第6～8図は現像剤供給容器の筒壁の断面図を示し、第9図は現像剤供給容器の筒壁の断面図、第7、8図は筒壁の断面図、第9～11図は収容容器の他の実施例を示し、第9図は筒壁図、第10図は筒壁図、第11図は

図5

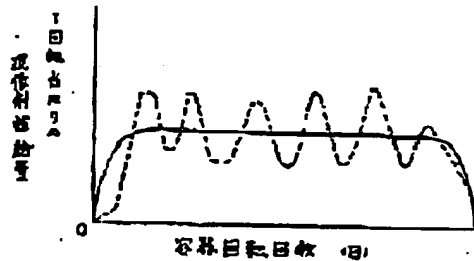


图 3-2882 (5)

图 1

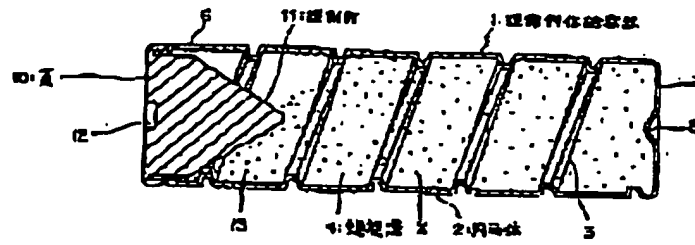


图 2

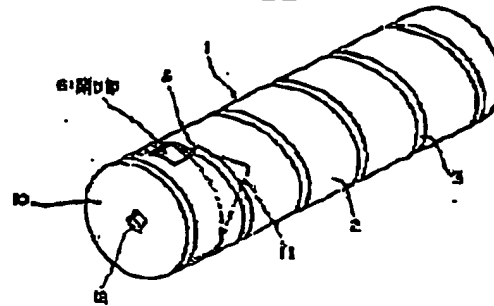


图 3

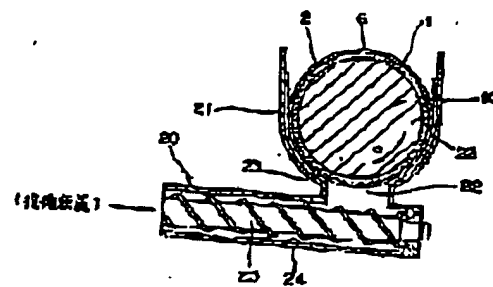
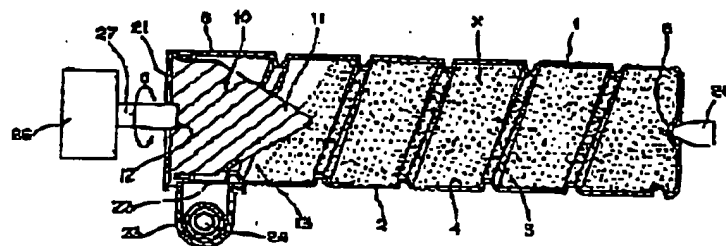


图 4



特开3-2882 (C)

